

ABSTRACT

5 **PARTICULATE REINFORCED ALUMINUM-BASED COMPOSITES, THEIR**
 COMPONENTS AND THE NEAR NET SHAPE FORMING PROCESS OF
 THE COMPONENTS

 This invention concerns particulate reinforced Al-based composites, and the
near net shape forming process of their components. The average size of the
10 reinforced particle in the invented composites is $0.1\sim 3.5\mu\text{m}$ and the volume
percentage is $10 \sim 40\%$, and a good interfacial bonding between the
reinforced particulate and the matrix is formed with the reinforced particles
uniformly distributed. The production method of its billet is to have the
reinforced particles and Al-base alloy powder receive variable-speed high-
15 energy ball-milling in the balling drum. Then, with addition of a liquid
surfactant, the ball-mill proceeds to carry on ball-milling. After the ball-milling,
the produced composite powder undergoes cold isostatic pressing and the
subsequent vacuum sintering or vacuum hot-pressing to be shaped into a hot
compressed billet, which in turn undergoes semisolid thixotropic forming and
20 may be shaped into complex-shaped components. These components can be
used in various fields. This product is featured with excellent property, good
machinability, stable quality, component near net shape forming and cost
effective and higher performance.

25 (Figure 5)